THE OPTICAL

MAGIC LANTERN

JOURNAL

AND

PHOTOGRAPHIC ENLARGER.

EDITED BY J. HAY TAYLOR.

Vol. 5.—No. 59. [Entered at Stationers' Hall] APRIL 1, 1894. Price One Penny.

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Notices.

The *Optical Magic Lantern Journal and Photographic Enlarger* is issued on the 1st of every month, price One Penny, and may be obtained from all Newsvendors, Railway News Stalls, Photographic Dealers, or from the Publishers, at the following rates, post free:—

		United States.
12 months	2/-	60 cents.
Single copies	-/2	6 ,,

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Exchange Column, General Wants, &c. (not Trade)—First 20 words, 6d.; and for every 3 additional words, 1d.

Advertisements must reach the office not later than the 24th of each month. All cheques and postal orders to be made payable to Taylor Brothers.

Editorial communications must be addressed, J. Hay Taylor. Advertisements and business communications to **Taylor Brothers, 56, Chancery Lane, London, W.C.**

American Agents:—The International News Co., 83 and 85, Duane Street, New York City.

NOTICE.

	Each.	Postage.
Binding Cases for 12 numbers	1/-	1½d.
Reading Cases with 12 cords at back	1/3	1½d.
A limited number of bound vols. for 1893	3/6	4½d

Notes.

Those who are concerned in figures may find the following of interest:—The approximate weight of a molecule of hydrogen is given by an eminent authority as 0·000,000,000,000,000,000,000,04 of a gramme; multiplying this inconceivably small number by 55, the atomic weight of iron, the weight of a molecule of iron is ascertained—0·000,000,000,000,000,000,002,2 gramme. In the sulphocyanide test the presence of thirty-three ten-millionths of a gramme of iron is detected; dividing this number by the weight of one molecule of iron, it seems that this apparently delicate test is unable to indicate to our senses a less number than 1,500,000,000,000,000 molecules.

* * *

The Trinity House authorities have lately perfected a system for recording the comparative illuminating intensities of the electric light with oil and gas, and a report will shortly be issued by the Trinity House Committee.

* * *

A short time ago, whilst some 400 scholars of a school at Godalming were being arranged in a group upon a wooden staging 20 ft. high in order to be photographed, part of the structure collapsed and between twenty and thirty boys fell to the ground. Three or four cases of dislocated limbs occurred and a panic ensued. The sufferers are progressing favourably.

* * *

We enjoyed a very pleasant evening on the 16th ult. at the Bloomsbury Hall on the occasion of an entertainment held by the employees of the Eastman Photographic Company. The first part consisted of songs, recitations, &c., and the second of the exhibition of a large number of lantern slides made from Kodak negatives obtained at the Chicago Exhibition. A running comment on each slide was given by Mr. Ryder, the Secretary to the Company, and the lantern was lent and manipulated by Mr. Butcher, jun.

* * *

It being the intention of Messrs. Hughes & Son, opticians, of Fenchurch-street, to give up their lantern and slide department, the stock, the selling price of which is about £3,000 has been purchased by Mr. Walter Tyler, of Waterloo-road, S.E.

* * *

"A Tramp from Zermatt to Argentière with a Camera" was the title of the sixth lecture of the session, given at the Literary and Scientific Society, in connection with Unity Church, Islington. The lecturer, Mr. J. W. Reed (Quekett Microscopical Club), copiously demonstrated his subject by over one hundred lantern slides from negatives taken by him during his late visit to the "Alps." Mr. Reed conducted us to the Chablais Alps; took us over glacier, avalanche, and snow pyramid; across snow bridges, crevasses, and such waterfalls as that to be seen at the Prarangen; the Matterhorn and Mettelhorn, with their neighbouring mountains of snow; and on to the Chain of Mont Blanc. A Frena camera was used in taking the views, and, out of 130 negatives 110 were successful, which, considering the disadvantages, is a splendid average.

* * *

Mr. E. H. Kloot, manufacturer of lantern and other scientific apparatus, of 18, Aldgate Avenue, E.C., has recently admitted a partner and increased his business accommodation. The firm will in future be styled E. H. Kloot & Co.

* * *

Mr. M. Jones, of Frizington, has hit upon a novel method of encouraging the children of the Frizington board school to be punctual in their attendance. He gave a lantern entertainment a few days ago, the conditions for free admittance being a full attendance at school for the previous month.

* * *

The lease of the premises in Pall Mall, occupied for many years by R. W. Thomas and Co., Limited, having expired, this firm intend making their factory and offices at Thornton Heath the headquarters for all communications in future.

* * *

There has of late been a good deal of discontent manifested among the owners of gas cylinders made by the Projectile Company because of the refusal of certain gas companies to fill them. A new oxygen manufacturing and gas compressing company is on the eve of commencing business, and among the many inducements which they hold out to lanternists and others, we learn that they will test cylinders, any make (free of charge), preparatory to filling; that the prices of both oxygen and hydrogen will be lower than hitherto, whilst the quality will be equal to the best at present obtainable. Agents are shortly to be appointed in the principal towns. In the meantime Mr. Walter Tyler, of Waterloo Road, S.E., has been appointed principal agent, and during the last few days some hundreds of cylinders have passed through his hands for testing and filling. We had intended to have announced full particulars of this new firm, but, owing to some minor details which have yet to be arranged, we must postpone them until next issue.

* * *

The Planet Electrical Engineering Company have introduced an automatic electric lantern lamp, and invite those interested to call at their show-room at 67, Piccadilly, W., and see the lamp in action. The cost of current consumed in this lamp is, they claim, one-fifth of the cost of oxy-hydrogen gas where lime-light is employed.

* * *

The sole wholesale agents for London and South of England for the Scientific apparatus, manufactured by Watkinson & Co., of Leeds, are now Butcher & Son, of Blackheath, and 315, Regent Street, S.W., at which latter address a new show-room is being fitted up, at which small urgent trade orders will be filled. Butcher & Son's well-known specialities will be retailed at their premises in Regent Street.

* * *

Mr. H. G. Banks is an energetic man. He went to the opening of the Chicago Exhibition, took negatives of everything of interest, and then hurried back to London. During the ocean voyage, assisted by his wife, he wrote an interesting lecture, and within a few days of his return had excellent lantern slides made and coloured from his negatives, and since that time until quite lately he has made a large and successful round among the British Isles, engagement upon engagement following each other with brilliant success. Having lately associated himself with Mr. Graves, he has taken premises at 366, Clapham Road, S.W., which are being fitted up for the manufacture and sale of photographic and lantern apparatus. The firm will be known as Banks & Graves.

A Simple Means of Registering Lanterns.

A COMMON trouble with many lanternists seems to be "how best and simplest to register my lantern." Although various means have from time to time been suggested in our back numbers, perhaps the following will be found to be as quick and certain a way as any.

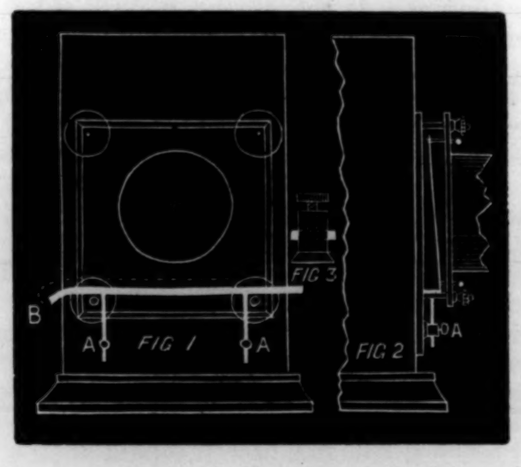
This method is one adopted some time ago by Mr. H. Wood, 13, Sturdy Road, Albert Road, Peckham, S.E., who, we believe, has lately been fitting this attachment to the lanterns of many of his fellow lanternists. Mr. Wood lately brought to our office the fronts and explained in a few words how quickly the necessary adjustment for registration could be made.

It might be well here to say a few words respecting the meaning of the registration of lantern fronts, especially as we are constantly adding new readers to our already large list, and it is quite possible that some of them may like to hear a few words as a groundwork.

If a single lantern only be used, all that is required is to place the slide in front of and close to the condenser, making it as central as possible. Now, if a bi-unial is to be employed, it follows that it will be used for making the views dissolve into one another, or for producing effects in which two slides are projected upon the screen at one and the same time. These two slides we will suppose to be daylight and moonlight scenes. As is well known, these two slides will be exactly the same in outline detail, the difference being for the most part in the colouring. The day scene being on the screen, and it being desirous to change or dissolve it to the moonlight one, it follows that these two slides must fall with mathematical precision upon the same parts of the screen, so that when both are projected they will practically have the appearance of one picture. When both are on, the former is taken off by, say, lowering the light, thus leaving the second slide in view. In order to get this effect of the two slides falling on exactly the same parts of the screen two things are necessary. The slides must both have the same relation to their frames, and the frames must be placed in the same relation to the condensers.

We will deal first of all with the method for registering the lanterns themselves and then speak of the slides.

It will first be necessary to obtain templates, which may be two frames, each containing a glass of the same size that is used for lantern plates; in fact, a good thing to use is an ordinary coated lantern plate. These two glasses should be firmly fixed in their frames, so as to prevent the slightest subsequent movement. This having been done, it next becomes necessary to scratch a line across each plate on the gelatine side by means of a carpenter's gauge; the same is done from the end of the frame, so that we have two marked plates or templates precisely the same in every particular. Care should be taken to mark the side and ends from which the measurement was taken, for when using them in the lantern that side must lie on the runner and the end must butt on the stop. Having the templates prepared, it is by no means a difficult matter to register the lantern.



Now to refer to the lanterns; in the position shown in Fig. 1 (electric) terminals are secured in position on the plates by being secured by screws from the back of the plates as at AA. A runner is then constructed of brass about the width of a slide frame, and to it attached at right angles, two stout wires of sufficient length to pass through and become clamped by the terminals as shown in Figs. 2 and 3. These runners having been fitted to the various stages of either a double or a triple lantern, we next light up and place one of the templates in the stage, there being a small screw stop fitted at the side (not shown) to prevent the frame from going more than a certain distance, the other template is placed in the other lantern. One or other of the ends of the runners are now adjusted and clamped at AA until the horizontal lines which were scratched upon the gelatine template are exactly overlapping. This having been done, the adjustable stop alluded to at side of the lantern is set so that when each frame is taut against it the upright lines of the templates are, like the horizontal ones superimposed.

When this has been done the lantern is what is called registered, and we now come to the slides. For absolute certainty in working, the slides should have no shake whatever in their frames. The mode of procedure is the same whether a set is of two or half-a-dozen; but for the sake of brevity, we will consider the former. It must be borne in mind that under no circumstances must the adjustment of the stops and runners be interfered with so long as they render coincident the two template slides.

Now place slide No. 1 in the lantern and observe if the picture stands fair and square: if it does, then it is best left alone; it must of course be seen that the slide is close up to the stop at side of lantern. Then place the other slide in its lantern, and observe whether the two pictures coincide; the probability will be that they do not. If the second picture is too low, then the requisite amount must be planed off the frame so as to bring the picture lower down on the stage. Care must be exercised in the operation of planing so that too much is not taken off, for although in a set of two slides only, this can be rectified by taking a shaving off the other, this means of rectifying would hardly do in a set of six slides. The end of the frame that touches the stop must of course be treated in a similar manner. After a slide has been registered, it is well to again try the lantern by means of the templates before putting the slides away as correct. The process of registering the slides will be found both slow and tedious, but this is well repaid at the time of exhibition, when one, having ascertained that his lantern is in register, has merely to place his slides in as far as they will go, knowing that when the light is turned up the slide will be projected on the screen in correct register, and will require no dodging about to get it in right position.

It will be observed that in Fig. 1 there is a dotted line a little distance above the runner; this represents a strip of wood which Mr. Wood informs us he always carries with his lantern outfit in case he may have occasion to use any of the old small slides which are not infrequently to be met with.

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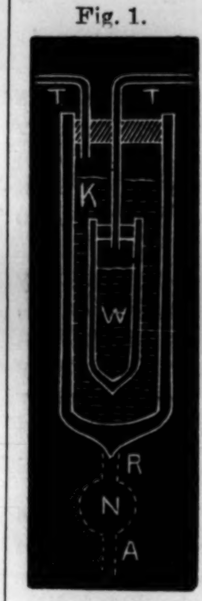
The Royal Institution.

UNIQUE EXPERIMENTS MODIFIED FOR OPTICAL PROJECTION.

PROFESSOR DEWAR has stated that in his earlier experiments with liquid air there were great difficulties in exhibiting them to a large auditory by projection, for hoar frost and ice quickly condensed upon the outsides of the glass containing vessels, interfering with the projection of the phenomena taking place inside them.

Fig. 1.



The accompanying cut, Fig. 1, shows how, at his last lecture, he made the solidification of common air visible to all in the theatre. K is a large tube, and W a smaller one, both at the outset nearly full of liquid common air. Both tubes are double ones, or "jacketed," with a highly perfect vacuum between the two skins, to almost arrest the entrance of heat from the air of the theatre. The interiors of the vessels, by means of the tubes TT, were placed in communication with two powerful machine air-pumps driven by a gas engine, down in one of the laboratories. Thus the liquid air in both, by its own rapid evaporation, cooled itself still lower until at last, at the bottom of the tube W, a solid button of common air was formed, looking like ice.

An ordinary high vacuum in the jacketing space would have been of no use for the purpose. The jacket is first filled with heated mercury, free from air bubbles, and then the metal is made to form a Torricellian vacuum in the parts represented in the cut, after which the glass tube is sealed at A, leaving nothing but mercury vapour in the space above. Liquid air in a tuft of cotton wool is then painted over the outside of the bulb N, to bring down the trace of mercury vapour as a mirror inside N, then the tube is sealed with heat at R, and N is detached. The dotted portion of the cut is far too short to be at all in proportion to the rest of the diagram, for the sake of saving space, but it answers to explain the principle of the construction of these vessels.

Fig. 2.

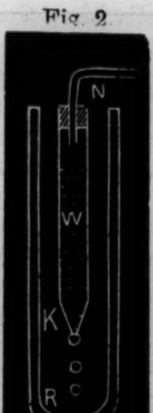


Fig. 2 shows how Professor Dewar is able, by the aid of the lantern, to show the liquefaction by cold of the air of the theatre, in an open tube, consequently at the normal pressure, K is the open tube with its vacuum jacket, W is a test tube coming to a blunt point at its lower end; this tube, at the outset, is nearly filled with liquid oxygen. By means of the tube N a powerful air pump is attached, and the cold produced by the rapid evaporation of the liquid oxygen causes the outside air to condense on the outside of the tube W, to trickle down its sides, and to fall in drops to R, where it collects in a small pool. The liquefying point of oxygen is 180° below the zero of the Centigrade scale, and that of common air 190° below the zero. Oxygen has not yet been solidified, unless mixed with abundance of nitrogen as in common air. Air and oxygen both form pale blue liquids; the latter has the stronger colour. Nitrogen, when solidified by itself, comes down as a mass of white crystals. Alcohol, dropped into liquid air. freezes hard in a few seconds, and if it be taken out, and a flame applied to it, it will not catch fire, being too cold. It first melts into a viscous liquid, like glycerine.

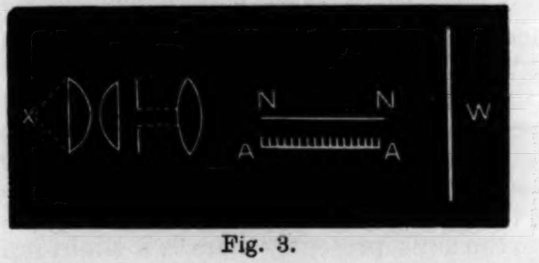


Fig. 3.

Another experiment by Professor Dewar was the production of an artifical mirage by the aid of the magic lantern. A condenser, Fig. 3, sent a parallel beam of light through a narrow horizontal slit in the opaque diaphragm, and an image of this slit was projected on to the screen, W, by the lens, but the light, in its passage, was made to almost "graze" the upper surface of the iron plate N N. This plate was then made very hot, by means of the flames from a row of gas jets AA, in order that the plate should somewhat resemble a flat sandy desert, but because of its small size it was made much hotter than a desert, to produce the mirage effect. As the plate grew hot, two images instead of one were seen upon the screen W, and continued there a minute or two after the gas flames were turned off. The upper image of the narrow slot was due to a mirage effect, the air close to the hot plate being more rarefied than the air a little higher up, so that the optical refraction of the two adjacent layers of air was unequal.

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Old Polytechnic Slides.

As has recently been mentioned in our columns, the choicest of the hand-painted slides which created such a *furore* in days gone by at the Polytechnic Institution, are now the property of Mr. Edmund H. Wilkie, who, being connected with that Institution, was privileged to purchase them from the directors at the time when they were officially short of funds. We may say that Mr. Wilkie guards them with a jealous eye, and well he may, for they are of such a character that one seldom sees now a days. As they are all painted in a large size, they contain detail far exceeding anything that could be approached in our ordinary 3¼ by 3¼ inch slides of the present day. All the slides in question tion are painted on glass of 8½ inches by 6½ inches.

We recently had, by the courtesy of Mr. Wilkie, a grand treat—in a word, he invited us to spend an evening with him at his home at Hampstead—and we sat for some hours looking over and admiring a number of the old slides which had created such a sensation at the time when they were publicly exhibited. Before looking at the slides we inspected the lanterns that were used in the exhibition, sketches of which appeared in our issue for November last.

Pile after pile of the slides were conveyed to the table at which we were seated, and after we were forced to stop by reason of the lateness of the hour, we were informed that what we had seen was only a portion of his immense stock, and that, if at any time we would like to see more, we had merely to call again, which invitation we shall shortly put into force. As the measurement of each framed slide is 12 inches by 10 inches, and as Mr. Wilkie possesses some 300 of these slides, it necessarily follows that they occupy considerable room. Our hostess, Mrs. Wilkie, informed us that during the operation of dusting them she has to be personally present, "for," said she, "I don't know what my husband would say if one of them got broken."

As only a small proportion of our readers have probably had an opportunity of seeing these slides "in the good old days," we append a few particulars of some of those which we had the good fortune to inspect.

One of the pictures which first attracted our attention was the churchyard scene in the story of "Gabriel Grubb," one of the late Mr. George Buckland's entertainments. On Mr. Wilkie's dining-room wall hangs a water-colour by Mr. R. P. Leitch. This was the original design for the picture which was painted for the lantern by Mr. W. R. Hill. When Mr. Hill had "worked his wicked will" upon this subject, it had grown to a series of no less than sixteen slides—one view and fifteen effects. There are goblins coming out of graves, leaping over tombstones, streaming out of windows, standing on their heads and sinking into the ground. Illuminations of windows and clock faces, Gabriel himself in a number of different positions of surprise and terror, and at the close of the scene the whole picture moves, and we appear to travel down through the earth to the goblins' cave, passing through the various strata of unmentionable objects such as we might expect to find in churchyard mould. In this same set Mr. Hill also introduced a panorama, the glass of which is 38 inches by 8 inches, illustrating Gabriel's walk from the village to the old abbey church. Very interesting are the views representing the most beautiful portions of the Rhine and its legends, most of which were painted by Mr. Hill in 1867, and the remainder in 1880.

This series includes one of the best effects ever produced at the Polytechnic, "Sunset on the Lake of Constance." By means of a number of sliding plates, the effect (which includes five slides) of the gradual change of tint on the mountains and water, as the fiery ball slowly sinks, is wonderfully rendered.

A gold frame through which passes a panorama of Rhine scenery is very striking, and has a minuteness of detail which it would be vain to attempt on a smaller scale.

The view of the town of Bingen introduces the legend of Bishop Hatto and the mice, and after the working of two effects is dissolved into a picture of the "Mouse Tower" on its rock, by moonlight. By the aid of special mechanism swarms of mice are then seen swimming the river, tumbling one over the other, and on arriving at the rock they turn upwards, scale the Tower, and disappear over the battlements.

The ruins of Heidelberg Castle may be mentioned as a remarkably fine view, luminous and full of colour, and the same may be said of "St. Goar," "The Lurley,"and "Count Rupert's Study." In the latter view are some soft and deep effects of moonlight as contrasting with the warmer lamplight.

In "Christmas and its Customs" we have an entertainment which was formerly produced every Christmas at the Polytechnic by Mr. J. L. King.

The views representing the customs observed by our ancestors were designed and painted by Mr. Hill in 1867, and are remarkable for the beauty of their colouring and unusual number of figures in the composition of many of them. One view representing the Hall of the ancient squire, with the great bunch of mistletoe hanging in the centre, has no less than forty distinct figures in it. Many *habitués* of the old Polytechnic may remember poor Mr. King's jovial face, rich voice, and portly form as he stood by his desk reciting the legend of "St. Nicholas." The picture represents a bedroom with the moonlight shining through the window, casting the shadows of the casements on the floor. During the recitation the occupants of the four-poster in the background are alarmed, and, starting up, proceed to the window. St. Nicholas appears in the fireplace, and after having fulfilled his task disappears again. Then there is "The procession bringing in the boar's head," "The origin of Christmas," Miracle plays, "Carol-singers," and a variety of others, every picture having at least one effect. The champion effect produced at the Polytechnic was considered to be "The parachute shell." Mr. Wilkie especially desires that we should not make known the means by which this effect is attained, but it appears on the screen thus: A dark landscape, with two soldiers and a mortar in the left-hand corner. It is supposed that the enemy are somewhere in the distance, and the general accordingly decides to liven them up a bit. An explosion is seen from the mortar, and by the light of its fuse the shell can be traced soaring high up into the sky; presently there is a slight report—a flash—as the shell explodes, and from it drops a small parachute supporting a magnesium light. This is sufficient to illuminate the country round. The enemy's camp is seen in the distance bustling with activity; men and horses marching for a night surprise. The shell, however, by throwing a light on the subject, prevents this, and causes much surprise to the other side.

The last series we were able to inspect in the time, at our disposal illustrated the tale of the "Heart of Stone, a Legend of the Black Forest." These pictures possess a vast amount of detail—the fir trees, rocks, beds of ferns and wild flowers are all represented with great fidelity and richness of colouring. Dutch Michel the Giant chases Peter the Glass-blower down the mountain, and in striking at him breaks his club on a stone cross. This is illustrated by two views, both of a very forcible nature, and the effect of declining day seen through the trees is beautiful and natural. "The interior of Peter's cottage," "The exterior of the Ale-house," "The fir tree forest," and particularly the "Glass-blowers in the Black Forest," are all remarkably fine.

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Hand Cameras for obtaining Slides for the Lantern.

No. 29.—The "Genie."

About this time of the year it has been usual for us, in the past, to commence our articles descriptive of hand cameras. We have pleasure in commencing with an account of a small and neat camera termed the "Genie." The body portion of this camera is made by the Genie Camera Co., of Philadelphia; the lenses are, however, fitted and made by Messrs. Watson and Sons, 313, High Street, Holborn, who are also the European agents for this apparatus.

The camera is of the magazine class, and will hold either 12 quarter plate holders or 24 film holders. The plates or films, as the case may be, are placed in a magazine, which is shown at Fig. 1, each being previously inserted into a sheath supplied for the purpose.

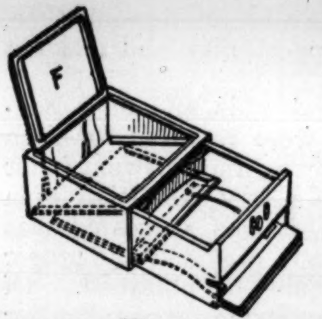

Fig. 1.

The magazine having been placed in the camera, the first plate will now be in position for exposure, but the safety door or spring lid F must first be opened. This is done by a touch on a knob at side of camera. The plate is now open to the shutter, and may be focused by an index disc placed under the camera. This disc is set for distances of 8, 10, 20, 50 and 100 (and upwards) feet. The shutter can be regulated for quick or slow speed; it is set by pulling a cord, and released by pressing a small knob.

Arrangements are also provided for making time exposures. A diaphragm disc, containing three sizes of stops, is fitted to the lens, and either of the sizes of aperture can be quickly brought into place.

The manner of changing the plate is simple and effective. The camera is held lens end upwards, the magazine drawn out as far as it will go, and then pushed back (see Fig. 2). Drawing the magazine out causes the shutter spoken of at F, Fig. 1, to close. The exposed plate is, at the time of pulling the magazine out, drawn from the pile of plates still in the camera, and when clear of them, falls to the back of the reservoir, whence it is conveyed to the bottom of the stack by pressing the magazine again into the camera. Reference to Fig. 1 will show that the magazine is composed of two parts, and that while the inner portion remains in the camera, it is the outer shell only that is withdrawn in order to change the plate.

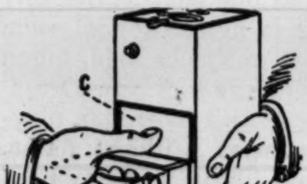

Fig. 2.

By completely removing the magazine, a focusing glass (or celluloid) can be inserted, and the camera attached to a stand.

Two finders are provided so as to accurately depict views on the plate when either in a horizontal or an upright position. The lens being by Watson, and Watson's lenses all being of a high class, it is not necessary to make any remarks upon them. C, in Fig. 2, represents a sheet of white celluloid, upon which may be written any notes or remarks upon the exposures.

Separate magazines, containing a supply of plates, can be carried in the pocket, and changed without any protection from light other than that provided.

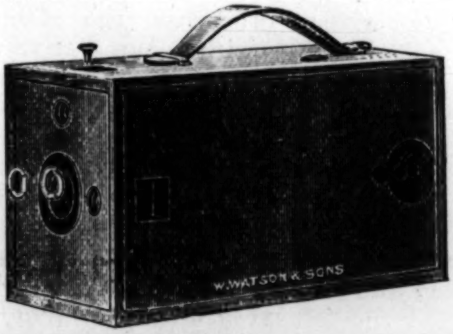

Fig. 3.

The camera is small, viz., 9¼ by 5¼ by 4¼ inches, is covered in black leather, and presents a neat appearance as will be seen from Fig. 3.

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My First Lantern-Show.

By C. Duncan Moore.

To begin in the orthodox fashion, many years ago, I cannot say exactly how many, but it was when penny postage stamps were printed in dark red, and cut apart with a pair of scissors; anyway, grey hair and rheumatics emphasize the lapse of time passed since then. It so happened that I, having just completed my Rugby course, under Dr. Arnold, added one to a community of some 1,500 souls, inhabitants of a small market town in the Midlands. Few railways then disfigured the land, or were telegraph posts an eyesore. When the iron road was even talked of as likely to run through the place, landowners rose in a body, as with one consent, to protest, with the greatest vehemence of which they were capable, that no such vandalism should be tolerated in their neighbourhood, spoiling the vegetation, frightening the cattle, and depreciating the value of property, and be, in fact, calamitous all round. No, none of the new-fangled ways for them. A horse and trap was good enough for their fathers, and their fathers before them, and was good enough for them. So it came to pass when the railway *was* made, it left this obstinate, short-sighted little town to its own devices, by opening a natty station at an obscure village some five miles away, which same village began speedily to increase in importance, and land in its vicinity in value, to the intense chagrin of the inhabitants of the once leading place.

In those days things moved slowly; a few carriers' carts, two or three times a week, went to and from the county town, some twelve miles distant, and were the chief means of keeping the place supplied with goods not produced in the immediate locality. A coach also ran through three times a week for the more expeditious passenger traffic, otherwise the sleepy old place jogged along with comparatively little contact with the outer world. Every Saturday the mail brought a supply of the *Weekly Advertiser*, containing full and fulsome accounts of local doings, and brief extracts from other papers, of how the world progressed in general. I need not say this paper was eagerly looked for and more eagerly read. It was, in fact, the sensation and excitement of the week. One issue contained the following announcement, printed in striking type, every other word beginning with a capital:—"An extraordinary lantern entertainment will be given in the National Schoolroom, Slowby Magna, in aid of the Slocum Sludge Almshouses, Nov. 4th, 18—, under the patronage of the nobility and gentry of the neighbourhood, by our well-known and esteemed townsman, Mr. Coriolanus D. Moore, who has received some marvellous moving pictures from *London*, exhibiting changes of the most surprising character, and expounding Nature in a realistic manner hitherto unattempted. Mr. C. D. Moore has also provided by his versatile pencil some sketches exceedingly interesting to the fair sex, of all the latest modes of millinery and dresses as worn at the present time by the aristocracy of *London*, in their varied colours and on life-size figures. Music and singing will be introduced at intervals by some of our best well-known local talent, who have kindly consented to assist. Afterwards a collection will be made in aid of the aforesaid deserving charity. The entertainment will commence at 7 o'clock, and conclude with a grand realistic scene from the Sikh War, showing the destruction of a fortress, with some original effects. In anticipation of a large attendance, application for tickets should be made at an early date to so-and-so aud so-and-so." This advertisement was sent by your humble servant, after much thought, consideration and sundry consultations with his friends, and these are the incidents that led up to it.

As a birthday present, a relation had given me a magic lantern, with a couple of dozen slides of various kinds. An exhibition was suggested as an excellent plan to get funds for a Christmas treat for the occupants of the aforesaid almshouses. The idea fermented in my mind for some time before I could see my way how to bring this desirable result about. Encouraged by the enthusiasm of my friends, and with an inate desire to become a public lecturer and lanternist—I must make a beginning some time, so why not seize the opportunity and make it now?

Certain appliances and odds and ends connected with the lantern were required for such a show to make it a success, and as twenty-four slides would make but a paltry exhibition even if eked out with music, it was suggested that I might make some myself, provided the proper transparent colours could be obtained. Of course my skill as a draughtsman was taken for granted—had I not obtained a prize at our Slowby annual school examination years before for drawing, and held my chin up high in consequence? R.A. looming in the future! There would be no difficulty that way at any rate, so to work I went, I must confess with only moderate success, and increased my number of slides to 150.

Here then was the backbone of the entertainment provided, and with some music thrown in would satisfactorily fill up an evening, at least I hoped so.

I was now fairly on the job, and had occasional rehearsals in our back parlour, with, as my friends said, uncommon success. The lantern was an oil one with one wick, none of your double, triple or quadruple monstrosities, but a steady going one wicker, and in the limited space of a back parlour gave a tolerably good light; but on trying it in the school-room where the meditated show was to be held, found it much too weak. Having read of the Drummond light and how oxygen and hydrogen play on a piece of lime gave a most brilliant flame, an attempt to produce this light was my next endeavour; of my failures I need not speak, they were numerous and discouraging, but perseverance overcame most of them, and I hoped to overcome the remainder on the night of the show.

Obtaining the loan of a couple of gas bags and a blow-through jet, and with the aid of some friends of mechanical proclivities, the apparatus was set up, the bags filled and a rehearsal decided on, which did not go quite so smoothly as we anticipated, the light was erratic in the extreme, and by the time we got it to work fairly well, the oxygen supply was in a great measure exhausted, owing to an unnoticed leak in the bag. This was remedied, and we hoped for the best.

Compressed gases were not obtainable in those days, and our method of oxygen making was original and one forced on us by circumstances. The oxygen mixture was procured from the chemist in the county town aforesaid. For a retort an iron tea kettle was requisitioned from the kitchen under the most solemn promises to bring it back uninjured, and to its spout, by the aid of cork, string and putty, some glass tube was securely fastened, leading into a wash-bottle, and from this by the cork and putty junction method, a pipe to the gas bag. The kettle was then put on the kitchen fire, lid luted firmly down, when my father, who had no sense of humour, immediately ordered it off, for he said he could not appreciate any advantage in blowing up the house, "No my boy, make your gas out in the yard," so out of doors a small fireplace was built with loose bricks and the gas making began; no bubbles came through the water for a long time, the kitchen bellows were vigorously worked, so that we began to think we had the wrong materials, but suddenly it rushed through in a torrent—stopped, we plied the bellows and away went the kettle lid with a report like a cannon, fortunately with no other damage than driving a hole through a window. The tube had become plugged with the violence of the action, and the lid had acted as a safety valve.

Another supply of oxygen mixture had to be obtained, and this time we went rather more circumspectly to work and succeeded in filling the bag without accidents. Of course these preparations took up a long time as our knowledge had to be gained by experience and the help of a few books on experimental chemistry.

The school-room was freely lent us for so worthy an object. The largest linen sheet we could obtain did duty for a screen, suspended from an iron tie-rod that went across the building as though it was made for it. I flattered myself that the series of modern fashions that I had carefully copied from some new fashion plates would be just the thing to please the ladies, and be good business. People were not so fastidious in those days and perhaps not one in twenty had ever seen a lantern-show, so the whole thing became an exciting novelty. After the manner of collecting in churches and chapels, we decided to send round the hat after the performance, at least, just before its termination, during the time some of the best pictures were on the screen. All being mapped out, the above advertisement was inserted in the weekly paper, which I read and re-read with much complacency, and the rush for tickets was tremendous; it was a great mistake as it turned out not to have charged for them, but let that pass, we didn't. The momentous night arrived, the audience too, and the room was well filled long before the time.

I had secured the services of our curate, who had vast interest in the proceedings, to give a sort of introductory address, not feeling very confident of my powers in that respect, before the lights were turned down, and I prepared to show the first picture. The illuminated disc gleamed on the sheet, and a brilliantly-coloured "Welcome" opened the show, wrong side up, but it was soon altered. A buzz of approbation, many long drawn "Ah's" and "Oh's," when fizz, pop, out went the light, and we were, so to say, bathed in darkness. After a little time we started again, getting through about twenty pictures, when there was a repetition of the fizzing and popping. The audience were very good natured, and looked on this as part of the proceedings, till we again started with better luck, getting through most of the pictures before the costume slides were shown, which, I was informed, were eagerly anticipated by the female portion of the audience. The latest modes in bonnets and dress on a life-sized model caused raptures. The "Oh's" and "Ah's" were more plentiful than ever, with a running commentary of criticism of the most animated nature.

Now was the time to send round the hat; everybody seemed in a good humour, and the show had succeeded. I just heard the chink, chink of coin dropped into a box specially devised for the purpose, when horror! the place was filled with dust and darkness, a report enough to crack the drums of one's ears, breaking of glass, and confusion. Something had burst; there were shrieks and a regular stampede, until the storm was somewhat allayed by our curate—he was a brick—shouting out above the din for people to keep their seats—that it was nothing to be alarmed at—only a new effect that had gone off before its time—it was to give realism to a battle piece which had been reserved till the end of the entertainment. Whether they believed it or not it had the effect of quieting them, and they filed out very orderly, but that subscription—it never was collected. No other damage was done than breaking the windows and bursting the gas bag. Fortunately, nobody was hurt. It was some years before I ventured on another public entertainment, and when I did I took good care to get subscriptions in advance.

Condensers—Double and Triple.

By C. Goodwin Norton.

There is just now some little stir in the lantern world about which is the better form for a condenser, whether it should be composed of two or three lenses, and also as to the best shape for these. This is chiefly owing to the fact that, now the limelight is so cheap and easy to use, lanternists are employing objectives of long focus to get better definition, a flatter field, and to place the lantern as far as possible out of the way of the heads of the people.

Now, these long focus objectives ought to be much larger in diameter than those usually supplied with the lantern, but as they are made small on account of expense, extra work has to be performed by the condenser. A good condenser will in some measure make up for the defects of an unsuitable objective and *vice versa.*

The ordinary lantern, whether single or double, as supplied by the optician, is fitted with 4-inch condenser, composed of two plano-convex lenses, each about 7 inches focus, making the combined equivalent or solar focus as near as possible 3½ inches. The objective is generally of 5¼ inches focus and 2 inches in diameter.

This combination does fairly well with an oil lamp, and for blow-through jet it shows a 10 or 12 feet disc; but it is impossible to get a flat field or to secure anything like the definition that is now demanded of the lanternist, particularly when exhibiting plain photographs, unless one is prepared to pay some £8 or £10 for the lenses, and even then the opticians who make these high-class condensers and objectives only guarantee a *practically* flat field.

The lanternist as a rule soon gets tired of having to readjust the rackwork of his lens to get different parts of his picture in focus in turn, or of hearing the lecturer continually saying "Can you make this a little sharper, please?" as he points to different portions of the picture. An objective of longer focus is then purchased, generally 8 or 9 inches, of the same diameter as the shorter focus; this, if of good quality, gives a flatter field, but the operator cannot get an evenly illuminated disc. Either there is a reddish ragged edge or the light must be pushed quite close to the lens; this makes a much brighter disc, but cuts off the corners of the picture. If the light is drawn back, a dark ring surrounds the centre, covering about one-third of the disc. This is primarily the fault of the condensers; but if the aperture of the objective were 2½ or 2¾ inches, the whole disc would be most probably equally illuminated.

But these large lenses cost a lot of money, at least £4 each with the necessary rackwork and tubes, consequently their purchase is with the average lanternist out of the question. He must be content to do with less light as far as the objective is concerned, and turn his attention to the condenser, and then his troubles begin.

There are at least six patterns in use, any of which is equally good for its particular purpose.

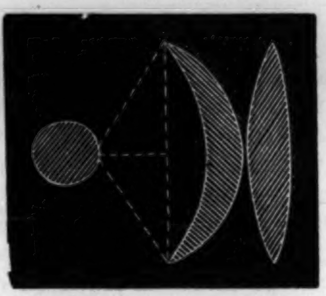
The greatest difficulty in the way of selecting a suitable condenser is to provide against its fracture from the heat of the illuminant. Therefore, the first question to be decided is how near the glass can the light be safely placed? Some authorities say this depends upon the thickness of the glass, but this is a fallacy; a thick glass is not more likely to break than a thin one, which is demonstrated by the fact that theatrical limelight lenses of 6-inch diameter, 6-inch focus, measuring some 1¾ inches thick in the centre, seldom or never break, though the light is often placed as close as 1½ inches to them, whereas the cover glasses used to protect the first lens of triple condenser constantly break.

When using an objective of longer focus than 5¼ inches, it is usual to remove the plano-convex lens of the condenser nearer the light and put a meniscus-shaped one in its place; this lengthens the focus of the whole condenser and allows the light to be placed at its former distance; but if the objective is of small diameter and longer in focus than 8 or 9 inches, this alteration seldom effects a cure for the ragged edge or dark ring.

A triple condenser in theory is the best shape of any because the lenses are each of long focus; this gets rid of most of the spherical aberration, but adds two more reflective surfaces by which a considerable amount of light is lost, much more than is generally supposed.

But the danger of breakage still remains, as owners of triple condensers know to their cost; this, with the fact that the front portion of the triple condenser must be changed each time an objective of different focus is used to get the best result, makes a triple condenser an expensive luxury, and soon the lanternist begins to wonder whether the undoubted gain of light is worth the extra amount of expense, trouble and anxiety.

There is another pattern of condenser, which, though it does not pass quite as much light, can be used for almost any focus objective and is practically safe from breakage except from such causes as the direct flame of the jet caused by an over-pitted lime or from a sudden draught of cool air, or by being burnished too tightly in its cell, all of which contingencies can be easily guarded against. This is what is known as the "Herschel" and was invented by the great astronomer of that name. This pattern must, however, be slightly modified for lantern work. For long focus the lens nearest the light should be a deep meniscus. This has the effect of placing the surface more equally distant from the light and giving it greater depth of focus, which makes it much easier to centre the light. The other lens should be bi-convex, but of unequal curves, the side nearest the slide to be flatter; this, for two reasons—mechanical, to allow the slide to be placed closer to the greatest diameter of the light, and the other, optical, as the spherical aberration is less if the curves are unequal.



A lantern condenser should be of 4½-inches diameter in order to properly cover those slides having square mats measuring 4 inches from corner to corner, and it will be seen by the accompanying diagram that the angle of light collected is nearly 90 degrees, which is as much as is claimed for triple condensers with two more reflective surfaces and greater liability to breakage.

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Lantern Lectures.

Is Their Popularity Declining?

By T. Perkins.

Year by year the magic lantern is becoming more and more useful, the toy of thirty or forty years ago has already taken its place among the recognised instruments of education, the science lecturer calls in its aid to elucidate his subject, the clergy are beginning to use it to bring more vividly before their people, in school-room services, scenes from Biblical history, and at no distant date we shall probably see a lantern screens trained beneath every chancel arch, and a lime-light lantern under the arch of the western tower; we already have a "Lantern Mission," the chief objects of which are to elevate the social, moral and religious tone of the masses in the poorer districts of our large towns. The lantern has been also used as a polemical agent, and has been thought by many likely to help in preventing the Disestablishment of the Church of England, though there are others who consider that the "Church Defence Lantern Lecture" is already played out, and the question likely to be decided on other grounds than a knowledge of mediæval history.

But apart from all these serious uses to which the lantern is put, arises the question which stands at the head of this article, "Is the popularity of lantern lectures declining?" From my own experience, which is, however, confined to country towns, most of them of under ten thousand inhabitants, I should feel inclined to answer in the affirmative. Now this is certainly, if it be the case, much to be regretted, and, therefore, after adducing certain facts which go to support my opinion, I propose to enquire into the causes, and then to suggest some remedies.

About fifteen years ago I became connected, as one of the managing body, with a Scientific and Literary Institution in a small town, and at that time we frequently engaged professional lecturers to deliver lectures, illustrated with lime-light pictures, at fees varying from five to ten guineas, to which we admitted non-members on the payment of a shilling or sixpence, according to the position of the seats occupied, and we found that often the proceeds were sufficient to cover expenses and leave a balance in favour of the Institution, and the deficit was never more than a small amount. But gradually the attendance at these lectures fell off to such an extent that of late years the loss on every entertainment was so serious a matter that the committee did not dare any longer to face the risk, and in other similar towns I have found that an announcement of a lecture on such and such a subject, illustrated by the optical lantern, failed to attract any considerable audience, and that the proceeds were often insufficient to cover the expenses of printing, hire of slides, &c., even when the lecturer and operator gave their services gratuitously. How is this?

First, I think, when we begin to enquire into the matter, we shall find that it is not only the limelight lecture but also any form of lecture that fails to attract, as it once did. This is due to various causes; first, to the fact that books on almost every subject are so much cheaper, and that the number of periodicals containing articles on all conceivable branches of knowledge are so much more numerous, that those who desire information on any subject may get it at home without turning out on a possibly cold winter night, and consequently the attractions of a quiet evening by their own fireside, prove more powerful than those of the lecture, whereas, formerly, the lecture was often the only available means of acquiring such information. Again the pressure of business is greater now than it formerly was, and therefore when any recreation is sought at the end of a day's work, it will be naturally something that is simply amusing, such as a concert of bright music, with plenty of comic songs, an evening at the theatre, or anything else that will require no mental exertion. The smoking concert, which supplies, to some extent, in small towns, the place of the London music hall, is exceedingly popular. Education, also, at the present time, embraces so many more subjects than formerly, that lectures at the town institution, such as I well remember, when I was at school some thirty-five years ago, were looked forward to with much interest by me and my schoolfellows, as pleasant breaks in the monotony of our education, which consisted almost entirely of Latin and Greek, Grammar and Algebra, Euclid and Arithmetic, have not the same charm for the rising generation as they had for us. The school boys and girls of the present day have their chemical laboratories, their applied mathematics and mechanics, their science or English literature lessons at school, so that to them, public lectures, a reading of some play, it may be, a sketch of some English author's life with extracts of choice passages from his writings, a course of experimental chemistry or mechanics, or an account of the marvels of astronomy, or the story of pre-historic times derived from ancient monuments or written on the rocks by the finger of nature, are not the novelty that they were to us, and forming as they do parts of school work, they are looked upon by the majority of boys and girls as lessons, and not as fascinating revelations of the marvellous in man and nature.

Magic lantern lectures have, therefore, only shared the fate of other lectures, if they have declined in public favour. When, thanks to the aid of photography, and more especially to the introduction of rapid plates, lantern exhibitions were suddenly raised in quality, they were, at first, eagerly seized upon, partly on account of their novelty, but by this time the freshness they then possessed has worn off, and those who were attracted solely by the novelty have got tired of them. This, however, was inevitable, and for it there is no cure.

But it seems to me that there have been other causes at work, and that the decrease in popularity due to these may be remedied. The causes may be summed up under the head of the poorness in quality of many of the lantern entertainments to which the public have been frequently treated. The poor quality is sometimes in the character of the slides, sometimes it is in the way in which they are shown, sometimes the chief fault is to be found in the lecture itself.

The most common way in which a lantern entertainment is got up in small towns is as follows:—Some one who wishes to amuse or instruct his fellow townsmen, and is the fortunate possessor of a good lantern, though in many cases he is not a photographer and does not prepare his own slides, sends to one of the firms that let slides out on hire, and selects some set of coloured pictures which duly reaches him a short time before the time appointed for the lecture, accompanied by a "descriptive reading." This he hands over to some friend who promises to read it to the spectators, while the giver of the entertainment manages the lantern. The first error, very probably, is that an exaggerated size is chosen for the pictures, a 15 feet or 20 feet disc is shown upon the sheet, the result generally being a somewhat dimly lighted picture, and the representation of figures considerably above life size. Far better is it, except in very large halls where many of the spectators are at a distance, to so place the lantern that the disc is not more than 8 feet or 10 feet in diameter, the brilliancy will be increased fourfold, the pictures reduced to more reasonable dimensions, and the coarseness of definition, which is so annoying when a large lantern picture is seen, except from a great distance, will be lessened considerably. Next, I believe, that most photographic slides are ruined by being coloured; for diagrams, maps, &c., colour is useful, but for general landscape subjects it is neither natural nor pleasing. Indeed if coloured slides are to be used I much prefer those painted on the glass without any photographic picture below the paint, for it is impossible by the addition of colour to the black, brown, or red tones of the photograph to arrive at the colours of nature, hence the coloured photographic slide shown on the screen is a hybrid, lacking the comparative truthfulness of colour that a skilful artist can arrive at on plain glass, and with much of the beauty of delicate detail and truthful lighting, given by the uncoloured photograph, blocked up and lost beneath the paint.

The pretty "effect" pictures, too, produced by biunial and triunial lanterns, soon pall upon the spectator, and to the frequent introduction of these and of coloured slides, I think is due the low estimate that many have of lantern exhibitions, as things suitable to amuse children, but not worthy of the serious consideration of their elders.

I would have the exhibitor who wishes to make his entertainment attract an educated audience of adults, show nothing but high-class photographic slides, uncoloured, and endeavour, gradually, to educate the public to admire soft rather than brilliant pictures, since the former are more true to nature; and when lecturing on a serious subject, such as history, whether ecclesiastical or secular, eschew, all fancy pictures, all "life model" arrangements, and be satisfied with simple photographs of localities and relics connected with the subject.

But as I have said already the reading often spoils an evening's entertainment. The preparation of a lecture is not an easy task or one that can be got over in a short time and with the little effort that the reader at a lantern lecture generally gives to it. The lecturer should thoroughly know his subject, should have it, as the common saying is, at his finger ends, should be able to describe the pictures readily, if possible from personal acquaintance with the places or things represented, and when this is not possible, from careful study and much previous reading. Then, if he has the gift of fluent speech, he will find it an easy matter to render the subject interesting to his hearers. Nothing, I think, can be more tedious than to hear a person reading from the printed pamphlet, often laboriously by the light of the shaded reading-lamp, the guide-book-like description furnished with the slides. The witticisms lose all their point and spontaneity, the audience have a painful feeling that the reader does not know what is coming next.

I have sometimes found it answer well when lecturing on certain subjects, to give the lecture proper first, either from a complete manuscript, or from notes, and then to turn down the gas in the room and show the slides on the screen, as illustrations of what has been already said, with only a few words about each picture, pointing out what is especially noteworthy. Thus the audience gain first a general idea of the subject, and then when they know the outlines will more fully understand the details when they are pointed out.

To sum up the points which I have been endeavouring to set before my readers. I believe that, from several causes, the interest in ordinary lantern lectures has somewhat waned of late, but that fresh interest would be awakened if more attention were paid by exhibitors and lecturers to the quality of the wares that they offer to the public. If the pictures might always be trusted to be worthy of the subject, and if the public could be induced to have confidence that the advertised lecture will be the result of thought and care on the part of him who delivers it, full of life and brightness, and not a mere perfunctory reading of that which has been written by someone else, and may be bought for sixpence, or which is thrown in gratis for the sum paid for the hire of the slides.

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Humorous Lantern Slides.

George Kilburn.

As a public lanternist, I am many times at a loss as to what to introduce as new, to please the various persons to whom I am frequently called to give a lantern entertainment, especially where there is a number of the juvenile element. No doubt there are many others—readers of this journal—who are similarly placed, but whose purses have a limit, cannot afford to go to a large amount in the purchase of slides, but have to rely on the cheaper kind of slide. Most of the humorous slides usually sold by lantern dealers, such as "Clown with moving eyes," "Kicking donkey," "Old Tom," are as stale and flat as some of the latter, so that the children know all about them before they are scarcely projected on to the screen, owing to the number of times they have been shown by various exhibitors. I have, therefore, hit on the idea of making some fresh subjects from pictures, which can be procured from stationers and others, some of which are to be seen displayed about Christmas time. To give an idea of the kind I mean I will here mention three different kinds of pictures suitable, from which lantern slides can be made; and if permission is required to produce them for the lantern, I have no doubt but what the proprietors of them would readily grant it if required. The first is a boy with spectacles on, reading a paper and sitting on a box; it is issued by Hignetts, tobacco manufacturers. The second is by Crosfields, of perfection soap fame, and is a picture of a boy creeping. The third is a picture of a boy laid down asleep; on the reverse side is printed a bird and the pupil of the eye, which shows the boy awake and gazing at the bird on the wing, when viewed by transmitted light. There is no publisher's name on this one, but has a name in one corner, signed Helena

Maguire. To make a slide for the lantern from such a subject as the latter, the picture can be photographed as viewed by reflected light, then the card turned over and the pupil of the eye and bird copied. If required to be used in a bi-unial, a slide can be made from the negative, with boy asleep; then another, having the bird and pupil of the eye on, taking care to place the bird and pupil to come in their proper places when it is dissolved on to the first picture. If this is carefully done, and the pictures nicely coloured, it will give a very pleasing effect. To use this picture for a single lantern it can be made into a slipping slide, by putting the picture on one glass 3¼ square, and the bird and pupil on to a glass 7 inches long. The picture by Hignetts' can be utilised as a triple slipping slide, and can be made thus: print the body without head on a 3¼ inch glass. On another glass, 7 inches long, paint the pupils of the eyes, also a pair of spectacles could be added if required. Next, print the head on a 7 inch glass, about 3½ inch from square end of glass, and the second head of self, or other local celebrity, 1¾ inch distant from first head, measuring from the nose.

A frame with 3 grooves must now be made or purchased, and the several glasses fixed in their proper order. First the glass with eye balls on must be fitted, allowing 1-16 inch for eyes moving. In the second groove fix a piece of thin board, with an opening 3¼ inch square, to receive the glass with the body without the head. In the third groove place the glass with the two heads on. Small bits of wood next glued to allow for the moving parts pulling out to the exact distance. The third picture, by Crosfields, is suitable for making either a slipping or dissolving slide. A copy is taken, as before, in the camera, and if for dissolving, two slides are made, and on one, another head is substituted. The original is first shown; then the second, with the head of some well-known person, is dissolved on quickly. A slipping is made by printing the picture on a 3¼ inch plate, but without head; the space where the head should be is left clear glass. The head is put on a glass 7 inches long, and a second head put the same distance apart as given in the previous one. Those who are in the habit of using such slides will understand how they should be fixed. The glasses 3¼ inches must have the background blocked out, and only show the figure. Any similar subjects can be thus treated, therefore readers of this journal will have some idea how to introduce new subjects for the amusement of the juvenile fraternity. Stereoscopic transparency plates are suitable for the long glasses of slipping slides.

The Lantern in Church.

By G. W. Nash.

A short time ago an article appeared in this journal advocating the use of the lantern in schools. Admirably written as it was, I wished at the time that the reverend writer had gone further, and shewn the advantages which would attend the use of the lantern in church. No one would, I think, deny that we are taught more by the eye than the ear. If the eye wanders, the mind soon goes after it, and thus an eloquent sermon or carefully thought-out lesson loses much of its value in transmission. Every teacher knows how much easier his work becomes when he has a picture with which to illustrate his lesson. He can teach more in a few minutes by the aid of a picture, than he can in half-an-hour by mere verbal description.

Now what are the difficulties to be encountered when introducing the lantern in church? First, we have people (both clergy and laity) who are shocked at the idea because it is something "new." They *must* run along the orthodox railway line method, and cannot get off the track. Others are horrified at the bare idea of a "magic lantern," as they call it, in church, the lantern being an article associated in their minds with school treats and entertainments. Others, again, are afraid that there might be some hitch in the working arrangements, a picture upside down, or the light suddenly going out, etc. It is much to be deplored that they should have reason to expect such mishaps. I am constantly finding that the lantern is made unpopular by incompetent exhibitors. It is a well-known saying "Every man thinks he can manage a little farm," and it might be said also "Every man thinks he can manage a lantern."

Now, I say at the outset that the use of the lantern in church demands the most careful and painstaking attention to details, together with the best of apparatus, and an experienced operator. If the exhibition is not to be given perfectly and reverently, without noise or bustle, the idea had much better be given up. Every lanternist will agree with me, that when the lantern is used in church it has reached its highest and most honourable place.

When the vicar and I first contemplated giving a series of "picture sermons," we set before us a high ideal, and we spared no pains to reach the perfection for which we worked. These services were intended for children, but from the first have been attended by crowds of adults, who have pronounced them a splendid success. These same people had opposed the idea of pictures in church, but now wish for more, and to have them regularly and often.

I trust brother lanternists may find a few useful hints in the following, which will show how to give a lantern service in the best possible manner.

The exhibition of the pictures must not interfere with the worship, or detract from the sacred character of the service, else an important objection can at once be made. The apparatus should, if possible, be placed at the extreme west end of the church, and should be hidden till required by curtains or a screen. When the picture is to appear, the curtains should be parted only just enough to allow the beam of light to pass through, so that nothing is seen but the lenses, the object being to prevent any temptation to look round at the lantern. If there is a gallery at the west end of the church, the labour of elevating the apparatus to a suitable height will be much lessened. This will be seen better when we speak about the screen. Long focus lenses will be required if the size of the picture must be limited, as will sometimes be the case, and a brilliant light is a *sine qua non*, as the gas cannot be turned out, and there may be (as in my case) an immense chandelier just behind the centre of the screen. This leads me to say that an opaque one is far the best when obtainable. My lantern was a hundred feet from the screen, consequently a quantity of light was lost on the way, the gas lights helping to diminish it.

If it is necessary to have the lantern adjusted beforehand and put away, the positions should all be carefully marked to ensure the pictures appearing in centre of screen. I had to arrange my apparatus after morning service was over, in order to shew the pictures at 4 p.m.

The screen should be hidden till required, and this will tax the ingenuity of the operator severely.

Ours is an ordinary one, 20ft. square. It was so arranged that by a simple movement or two, it flew into its place in a moment, having been out of sight the first part of the service. It is done in this way. High up on either side of the chancel archway, on the choir side, pulleys are placed and cords passed through, and through the top hem of the screen. By these means the sheet is easily drawn, and during service hangs behind one side of the archway, being fastened at the top and bottom on that side only. It is readily brought into place, and also withdrawn as readily, by a choir boy. I might mention that the screen hung high enough for the altar to be seen from beneath, as some people would object were it hidden.

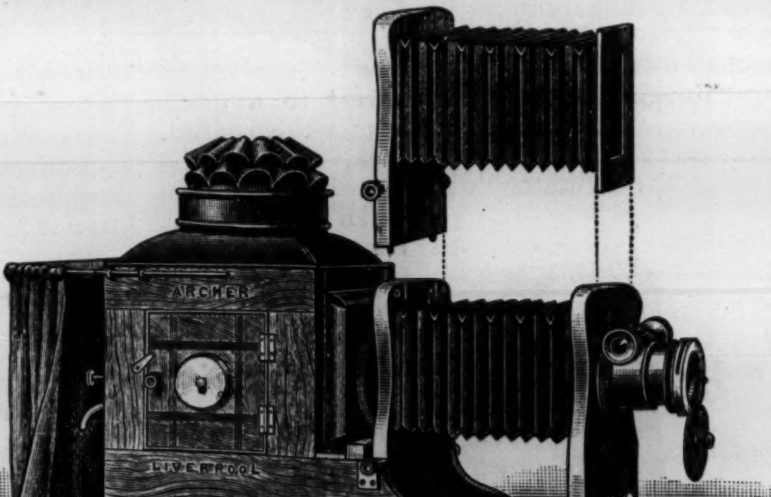
An electric buzzer or bell, with the gong removed, should have its push placed in the pulpit, so that the operator has notice when to change the picture. The sounder being close to the lantern, will not be heard by the congregation.

Now we come to the slides, by no means the least important part of the whole. These should be the very *best* obtainable. There are plenty of so-called sacred slides to be had, which are really comic and most crude. These, if used, would speedily banish the lantern from church. Avoid them if you wish your picture service to be a success. A bad sacred slide is the very worst slide. Good scripture slides are very scarce, though good scripture *pictures* are plentiful enough, and it only wants more demand to create a better supply. I only know of one or two firms who lend really beautiful slides for this purpose. If a shilling or two is of consequence, it must not be saved here. This applies most especially when the congregation is a high-class and critical one, as it was in my case.

I may say, in closing, that much time and trouble will be needed to get all the details perfect. We found it necessary to carefully rehearse the whole beforehand, but were well repaid for our trouble by our great success.

——:o:——

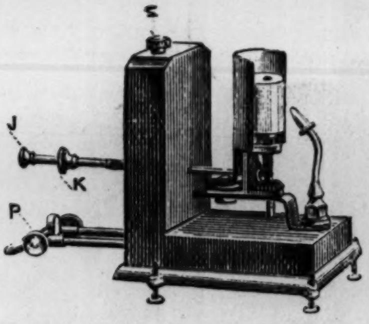
New Apparatus, etc.



ARCHER'S IDEAL NO. 3 LANTERN.

Everyone knows, or at least ought to know, the Ideal lantern of Messrs. Archer & Sons, Liverpool. It is a high-class and, consequently, expensive lantern. In their Ideal, No. 3, they have produced a lantern of slightly less elaborate workmanship, yet embracing all the best points of the other, at a lower and more popular price. We give a cut of this No. 3 Ideal. The bellows front is capable of extending to 14 inches, so that a lens of any focus may be used. The object lenses, which are interchangeable, are double combination achromatic, and are fitted in mounts, which fit into one jacket. The foci of these are 5¼, 6½, 8, 10 and 12 inches. When required in connection with experimental work the bellows can be lifted out, leaving ample room for a table to be placed between the condenser and lens. The front draws out to suit the requirements of various lenses, and can be quickly clamped in position.

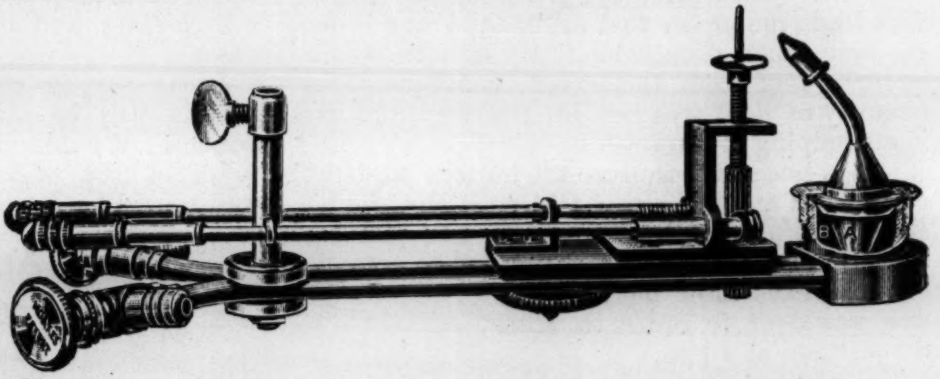
THE TIMBERLAKE SATURATOR.



The annexed cut represents the latest saturator of Mr. Timberlake's invention. It is similar to the one shown at the discussion on saturators by the Lantern Society on February 12th, and previously patented by him. The vessel looked at sideways is L shaped, and made from a solid brass casting, or seamed sheet copper to order. The lime is raised or lowered by turning a milled head, J; and lime advanced toward, or withdrawn from the jet, by turning milled runner K. Pure oxygen is admitted through valves P, that, passing through the first goes direct to a block under jet. That, passing through the second, and going into same block, is diffused through the saturator by means of a split tube below the other. Passing through the saturator it collects the ether vapour, which is admitted to two tubes open at the top of saturator, which conduct it into concentric passages in the block; there it passes injector fashion past a valve o the nipple, where it is ignited. By manipulating valves P it is claimed that a quiet, pure light of 100 to 500 candle power (at will) may be obtained, the gases being under perfect control. This saturator is about 5¼" long by 5¾" high by 3½" wide, and is raised or lowered by milled screws. It is useable for bi-unial lanterns, when purposely made with a dissolver attached just below the nipple, and telescopic tubes to the top jet.

NOAKES' MIXED JET.

Messrs. D. Noakes & Son, of Greenwich, have on numerous occasions rendered noisy jets quite silent and workable, and this is how they do it. They prepare the mixing chamber to receive their new patent cone, so that, as they claim, the gases get a thorough mixing before they reach the nipple. The gases when they enter the lower chamber B have a whirling motion imparted to them, after which they find their way through the hole at the lower end of the cone, by which they enter the upper chamber A. We have seen the light produced from jets fitted in this manner, and must say that the light given was very intense, and yet quite silent. All the new high-class jets of this firm are now made with this patent double chamber, and we learn that they are greatly admired.

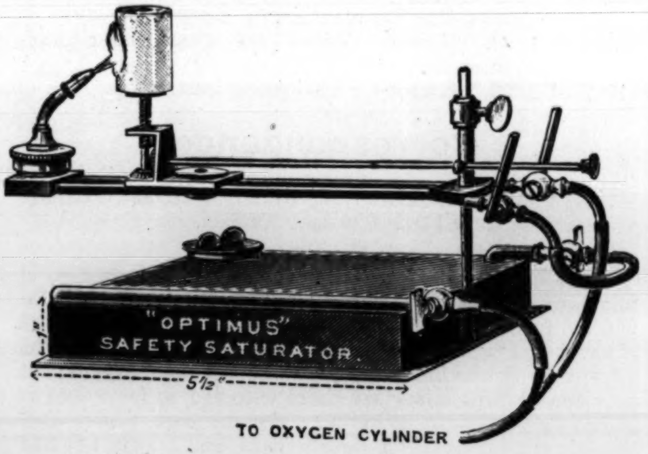


ROPE COVERINGS FOR CYLINDERS.

Convenient cylinder cases, which fulfil all the requirements demanded by the railway companies for cylinders being sent by rail, are now being introduced by Messrs. Riley Bros., of Bradford. The cases are light and excellent for the purpose, and when slipped on a cylinder are tied round the neck as shown in the adjoining cut. Whilst cylinders in boxes cannot be returned as "empties," they can be so sent when covered with such material and in the manner spoken of.

Optimus Saturator.

The experiments that have lately been conducted by Messrs. Perkin, Son & Rayment with respect to saturators has resulted in their bringing out one of their own, which, we understand, they have patented. We recently received one from them, and have used it several times, each time with great success. The saturating chamber is little larger than the ordinary sliding tray of a lime-light jet, it being of the style and size denoted in the annexed cut. The tube coming from the cylinder is provided with a Y piece, to which tubes are attached as shown. That towards the left is sprung on to the metal tube which is brazed on the top of the saturator, and which enters the stuffed chamber at the front end. As the saturator is divided off so as to form the conditions of one long stuffed tube, the oxygen has ample opportunity of taking up a sufficiency of ether vapour, as the chamber has capacity for about eight ounces of ether, with which it can be charged at the screw plug shown at the far side. The lights are regulated at the jet in the usual manner. The metal tube at the far side being the outlet for the saturated gas, connection is made with it to the hydrogen side of jet with a piece of tubing. Should it be required to use this light with a bi-unial lantern, the firm recommend that one saturator be used, and that in the bottom lantern; while connection is made to the top jet in the usual manner, the dissolving being effected by an ordinary dissolving tap.



Noakes' Transit Case for Cylinders.

We have received from Messrs. Noakes & Son, of Greenwich, one of their cases as above; it is strongly made of $\frac{7}{8}$-inch wood, and is iron bound. It is so strong that there is little fear of it or the cylinder which it may contain being damaged by the roughest handling possible in transit. For use the cylinder can be left in its case, for a pin is sent with each, so that the cylinder can be raised a sufficient height in its case to allow of attachment of regulator and turning on of the gas. This is effected by raising the cylinder, and inserting the pin in a hole provided for the purpose. The sizes up to fifteen feet are provided with a handle at side for carrying, and the larger sizes have fillets round the ends to give increased steadiness when standing. It will be observed the case serves the double purpose of a transit case and a stand. The case is closed by a loose lid, which is fastened by means of a couple of nuts of $\frac{3}{8}$ in diameter, and if these happen to get lost they can be replaced at any ironmongers at the rate of four a penny. The cases are painted black, and, when necessary, two of them can be readily clamped together as one package.

The Photoret is the name given to the smallest magazine camera made. It is only the size of an ordinary watch. The pictures are taken on films, each film being arranged for six pictures. The pictures are of course small, each being only a little less than half an inch in diameter. We have seen some of the pictures enlarged to twenty diameters, and they are surprisingly full of detail. The film is brought into position for a new exposure by grasping the instrument by the rim and moving the handle a little to one side. This movement also sets and winds the shutter, which can then be released by slight pressure on the knob. The watch camera is strongly made, is of neat appearance, and certainly cannot be called an inconvenient package, for it can be kept in the vest pocket, ready at any moment to take a picture under the proper conditions of light. The Photoret is the invention of an American firm, the English representatives of which are Messrs. Brigham & Sheldon, 102, Fore Street, London, E.C. The price of this watch camera is 10s. 6d.

Editorial Table.

EASTMAN'S BROMIDE PAPER: ITS USE AND MANIPULATION.—This pamphlet describes in plain and simple language and in easy stages all about the treatment of the Bromide Paper manufactured by the Eastman firm. Contact printing is commenced with and treated under the headings of Light, Darkroom, Sensitiveness, Exposure, Development, Clearing, Fixing, and so on up to the mounting of the finished print. Enlarging is dealt with much in the same way. After this the reader is treated to a number of hints in which the why and wherefore of things are explained. In the same pamphlet will be found their other papers, viz., Transferotype, Nikko Platino-Bromide treated in the same manner. Altogether this work contains so much valuable information condensed in small space that, after a careful reading, one is enabled to grasp the working details of any or all of the papers mentioned.

"DOWN IN A COAL MINE" would be a good title for a story to illustrate some slides which we have received from Mr. A. Pumphrey, of Birmingham. They are illustrative of the methods of working underground in order to procure coal. In the series sent we have lantern slides illustrative of what a mine looks like at the bottom of the shaft, the mode of directing ventilation, and the manner in which the coal in the various avenues is supported by steel trees. Other pictures illustrate the method of boring and undercutting coal in order to dislodge large pieces. These slides are issued as stereoscopic prints as well as lantern slides, and considering the amount of trouble involved in procuring the negatives from which these pictures are made, we consider the stereo views at 2s. to 4s. per doz. and the lantern slides at 6s. per doz extremely moderate, especially as they are executed in Mr. Pumphrey's excellent style.

BLUE BOOK OF AMERICAN AMATEUR PHOTOGRAPHERS.—The Editor, Mr. Walter Sprange, of Beach Bluffs, Mass., U.S.A., has collated the various photographic societies of America, together with the name and address of the members of each, into a book of one inch thick named as above. From it we learn that there are about 130 active photographic societies in the States. The book also contains much useful information in connection with patents, copyright, tariffs, moneys, &c., and also some fine illustrations. The prices are—cloth bindings, $1.25; paper binding, $1.

SUPPLEMENTARY LIST OF SLIDES.—The new list lately issued by Mr. Underhill, of Clarendon-road, W. Croydon, contains many new Scripture and other sets of slides, sundry lantern and photographic apparatus.

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Patent Intelligence.

The following list, relating to current Patent Applications, is compiled expressly for "The Optical Magic Lantern Journal" by a registered Patent Agent. For further information apply to S. Dicker, c/o "The Optical Magic Lantern Journal," 56, Chancery Lane, London, W.C.

RECENT PATENT APPLICATIONS.

No.

1964. 29 January. Charles William Appleyard. An improved valve for use in connection with compressed gas.

2365. 3 February. George Wright Guyer. The tray ether saturator.

2462. 5 February. Thomas Timberlake. An improved porous saturator for producing the "etho-oxo" limelight for single, bi-unial, or tri-unial optical lanterns.

2744. 8 February. George Foster Braithwaite. Improvements in apparatus for applying pressure to gas bags used in connection with the oxy-hydrogen light.

3457. 17 February. Edwin Charles Lacey and Maurice William Smith. Improvements in and connected with magic lanterns.

3788. 22 February. Sir David Lionel Salomons, Bart. An apparatus for exhibiting certain optical phenomena on the screen.

4324. 1 March. John Clark Shannon. Improved means for displaying an illuminating semi-transparent or transparent photographs and other semi-transparent or transparent pictures.

4556. 3 March. William Frederick Smith and George Harman. Improvements in automatic projecting machines.

4856. 8 March. William Freakley. Improved interchangeable casings for hollow metallic cylinders used for storage of compressed air or gases.

4884 of 1893. Potts. Cabinet for lantern slides.

COMPLETE SPECIFICATION PRINTED.

12929 of 1893. Müller. Valve for gas under high pressure.

24187 of 1893. Hughes. Projecting lanterns.

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Correspondence.

MECHANICAL SLIDES WORKED FROM WRONG SIDE OF LANTERN.

To the Editor.

SIR,—Can you inform me why it is that makers of mechanical slides invariably construct them so as to be worked from the "off" side of the lantern? I have heard it suggested that it is done so that an assistant, on the other side of the lantern, may work the mechanism; but how many lanternists are there who are so fortunate as to have an assistant at hand? For my part, I have used the lantern for nearly a dozen years, and I have not had an assistant half a score times during that period; and it is no joke, when hemmed in on the right side of the lantern, with a humorous picture which has some lettering in it, or a mechanical effect which must register with the picture on the screen, has to be put in and worked from the "off" side, and there is no friendly hand near to do it for you. I certainly think it would tend to the comfort of the operator if manufacturers would bear in mind that most lanterns are worked from the right side, and construct their mechanical slides in accordance with that arrangement.

Thanking you in anticipation for finding a corner for this grumble,

I am, Sir,
Your obedient servant,
R.K.D.

HINTS FOR BEGINNERS.

To the Editor.

SIR,—As I have given more than a thousand lantern shows, perhaps you may think the following hint to beginners worth printing. Get up your subject, don't depend on a reading more or less badly done, *e.g.*,—if I were going to show "A Thousand miles up the Congo," I should read Stanley's "In darkest Africa"; "The Congo and through the dark continent"; Ward's book; Troup's book; Jameson's book; Bartelot's book, and any others I could lay my hands on, and then talk to the pictures, not lecture with illustrations, but simply explain the pictures as if I were talking to a friend. Never read anything. If you want to quote, learn your quotation by heart,—*e.g.*, the last words of Captain Lugard's famous paper on Uganda should be quoted, not read.—Your obedient servant.

F.R.G.S.

GAS BURNERS FOR LANTERNS.

To the Editor.

SIR,—With reference to the note on page 22 of your February issue, the question raised was the selection of a gas burner for lanterns, and evidently what was meant was a burner for ordinary coal gas under ordinary conditions. Compressed oil gas is far more costly to prepare than compressed oxygen, and if cylinders are to be used at all, it is far better to use compressed oxygen and a limelight, as the light is more concentrated and better in every way than any gas flame can possibly be. Oil lamps may now be obtained giving, at a very small cost, a light of 100 candle-power, with a flame not exceeding 2 inches in width. I am not aware of the existence of any gas burner, either for coal gas or compressed oil gas, which has the same power, within the same diameter; and in addition to this, the intense heat evolved by a powerful gas burner would be both objectionable and unsafe in any ordinary lantern.—Yours &c.,

THOS. FLETCHER.

Warrington.

ELECTRIC LIGHT FOR LANTERN.

To the Editor.

SIR,—As suitable electric lamps are now procurable, it would, I am sure, be of interest to many of your readers who do not reside in places where current is supplied from a central station, if you would publish particulars as to the number, size, cost and weight of accumulators necessary to produce, say, 1,000 candle power for two hours, and also particulars as to construction of suitable cells, which many amateurs might prefer to construct for themselves.

If the cost and weight of such accumulators were not prohibitive, they would appear to possess many advantages over the compressed gas system at present used, as in most towns of any importance dynamos and the necessary plant for production of the electric light are to be found where the cells could be recharged, while the expense of sending cylinders long distances to be refilled is often considerable and most inconvenient; the greatly increased light would also be a further advantage.

If some of the makers would place on the market a compact set, including lamp and accumulators, at a reasonable price, not exceeding the present cost of cylinders, regulators and jet, &c., they would no doubt find a ready sale.—Yours truly,

"PROGRESS."

8th March, 1894.

We submitted the above letter to a well-known firm of electrical engineers—who supplied us with the following information—"A battery of twenty-seven cells would be required for running the lamp. This would cost about £70 to £75, and would weigh 1 ton 12 cwts. It could be recharged for about 21s., but this would vary slightly according to the charges of the different companies. About one and a half days would be required for this, it being better to charge the accumulators slowly.

"This battery would give a discharge of 130 ampère hours, or say sufficient for four or five performances of three and a half hours each, and the lamp would cost anything between £7 and £10.

"We should not advise the attempt to make the cells or plates, as it would only lead to failure, and possibly a law-suit from the holders of the patent for infringement.

"There is not the slightest doubt that the electric light would have many advantages over the present compressed gas system, and would be much less trouble, provided the first cost could be overcome."—ED.

REGISTERING LANTERNS.

To the Editor.

SIR,—The reason why the lantern which "Perplexed" owns is not provided with runners fitted with screws for vertical adjustment is simply that this adjustment has been permanently made in the fronts of the lantern during manufacture. Runners fitted with vertical adjustments are either supplied with lanterns not adjusted during manufacture or sold separately for application to lanterns originally unprovided with runners at all. If "Perplexed" will take notice of lanterns as usually stocked and sold, he will find, in nearly all cases, they either have no runners or merely strips of brass loosely held in place, which are quite useless, as neither they nor the stages holding them are parallel to each other. If runners fitted with vertical adjustments are once carefully adjusted, they will rarely need alteration vertically, provided the fronts of the lantern be at all well made, as it is generally possible to superimpose the horizontal lines by the nuts and clamping screws on the fronts only. Registering at home is best done with long focus objectives, as with these the necessary error at the top and bottom of the picture is less than when short focus objectives are used. This error is constant at all distances with the same lantern and the same objectives, but varies inversely as the square of the ratio of the foci of the objectives.

Yours truly,

EXPERT.

To the Editor.

DEAR SIR,—Last month your correspondent, "Perplexed," asked for opinions as to the utility of mechanical appliances for correctly registering lanterns and slides. To obtain satisfactory registration it is necessary that the lantern and slides be in such a condition that the operator can put on the screen any slide in his collection, with its accompanying effects, with the certainty that the two or more slides will appear as one complete picture, no change of outline being apparent either in flashing or dissolving.

This would seem a simple matter, and so in reality it is, needing only ordinary care, and a little common sense. Let us take the case of a Triple lantern for instance: it should be furnished with runners with a fixed stop at the end, just as described by "Perplexed," and should be so made that when the middle lantern is trained fairly on the screen the registering cross in the top lantern should simply walk down into its place as the top clamp screws are gradually released.

Theoretically the vertical line should register exactly without any movement to the right or left, and will do so practically if the lantern fronts are corrected when the instrument is first constructed, but any little lateral registration required can be effected by a slight turn of one of the clamps. Let me point out why in my opinion this is the only perfect method of registration. The proper place for the centre of the picture is opposite the centre of the condenser, and any contrivance which alters this position alters it for the worse, as a very little consideration will show us. A line from the point of illumination to the centre of the disc should pass through the exact centres of the condenser, the picture, and the objective, and no deviation from this hard and fast rule should be permitted by those who wish to get as near perfection as possible.

In registering the lanterns, therefore, the whole of the optical system, condensers, stages and objectives, should be moved in one rigid block, for please bear in mind that it is not certain slides we wish to register but the place they fit into. The slides of course must be registered by trimming the wooden blocks when the lantern is set, but when once this is done any slide will register in any of the three lanterns, or in any other corrected apparatus. The most elaborate mechanical effects can then be worked with ease and certainty. In my opinion "Perplexed" is quite correct in his mode of procedure, and his form of apparatus I think is the best.

Yours sincerely,
EDMUND H. WILKIE
(Late Royal Polytechnic Institution).

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Notes and Queries.

Robt. Worman writes:—I have a Lawson saturator, and according to the instructions I have been using it with the oxygen direct from the cylinder—I tried it with a regulator, but it made a noise and too much gas seemed to pass. I am desirous of using two such single saturators for a bi-unial lantern, but I find that the pressure at the cylinder has to be adjusted if I happen to require both lanterns on at once. Can I alter the affair in any way so as to be able to use an automatic regulator, for if I could it should answer my purpose. *Answer.*—When you have an automatic regulator on the cylinder it is only necessary to screw up the small valve that will be found under the jet portion until you get a quiet light. Adjust both the saturators in this manner and you will have no trouble.

Lantern.—From the measurements and sketch sent, you will not have sufficient room to use an adjustable stage as suggested, if you are to use framed slides of the ordinary size. Again, if your measurements are correct, an ordinary slide will in the present instance catch on the projections that appear to be at the ends of the pillars. We presume the instrument is an old one; if so, the best thing is to dispose of it and get one of a more modern style.

Arthur J. Adams.—We have repeatedly stated in this column that we do not institute comparisons between the same class of goods of different makers. We note the manner by which you request us to reply, viz., by placing numbers against the different makers' names, so that as you state—"no one but yourself can know to what it refers,"—but even this we cannot do.

M.B.—If you can give us a call we will have pleasure in showing you the tinted cover glasses.

B states that he has written to the address advertised some time ago in connection with the Suiter saturator, but has received no reply. We understand that the Suiter saturator, as advertised some time ago, has for some reason or other been taken off the market. Some time ago we heard that Mr. Suiter was at work on an improved kind, but we do not know by what means you can communicate with him if you cannot find him at the address stated. Probably he will read this and may send his address on to us. If you therefore write to us in about a week after this appears, enclosing a stamped envelope, we will send it on if we receive it.

S. Donnell asks how he can manage to use a lens of a long focus when he has drawn his lantern front out as far as it will go, but in order to get his lens to focus sharply the front is required to come out about an inch further than it will. *Answer.*—Get what is termed a lengthening tube, screw this in the lantern front in place of the lens and then attach the lens to the further end.

Rudd, Junior.—We have gone carefully over your long letter, but must confess that we are unable to find out what it is you want to know. If you send us a series of questions of a definite nature, we will do our best to assist you, but your letter we must say is rather jumbled.

Athenæum.—1. We should think that the purchase of the cylinder would be a good investment. Neither the oxygen nor the metal of cylinder will deteriorate as you suggest. 2. If the Gas Company test your cylinder you must expect to pay them for it. We cannot say anything about discount. 3. You may safely rely on the statement of the Company mentioned when buying a cylinder from them. 4. For single lanterns the taps you speak of are excellent, but for double or triple lanterns you will require an automatic one. We have for the past three years used one made by Noakes, and consider it quite safe to use the full pressure on it.

Jas. Throp.—The first part of your letter cannot be answered by us, for we must decline to say that one of the saturators mentioned is better than the other. In our opening remarks at the Lantern Society (see report in last issue) we stated the reason for pops. Like you we can make a saturator either give a pop or behave as a decent saturator should, and we always manage to make it behave as such. If you read the answer to Robt. Worman in this column, you will see that the little screw plug under the nipple can be screwed up so as to overcome your difficulty; if you almost close it and have not sufficient saturation of the oxygen, you can get a loud bang, but is not necessary that it be done.

Jex Bardwell.—If by the word "bad" you mean no better than others, the words *very bad* will apply in the present instance. Have sent a sample of the affair of which you speak, so that you will have received it before you read this.

F. M. Beaumont.—The analine has often been used, but the colours are very fugitive. If you have the number of this journal for August, 1891, you will find an article upon the subject.

W. De Laguna (Spokane, Wash. U.S.A.) writes:—Will you kindly, in the columns of your paper, help me in the following matter, which has caused me a great deal of annoyance? I am using a rotary pump for compressing the gases into the cylinders, and the valves are continually filled up with dirt and grease, which necessitates taking the whole pump and valves apart to clean them, which takes a long time, and also ruins the packing between the sections of the pump. I am using vaseline as a lubricant on the plunger. Is it that which is deposited in the pump? Kindly give the remedy in your next issue. I use a dry wash-bottle to pass the gases through before they go into the pump, so I know that the gas is clean and does not leave any dirt in the valves.—*Answer:* If you use (say) Englebert's cylinder oil instead of vaseline your troubles will disappear.

J. W. Garbutt.—In our next; crowded out.

John Hardman (Gawler, Australia).—If you have suitable stone you can cut it into shape with a periphery saw. At an emergency, such as you speak of, the bowl of a clay pipe, oyster shell, &c., could be used.

Delta.—Under the circumstances, we should say a single lantern with stage open at top, a saturator to go into lantern, and Archer and Sons' dissolver or changer.

C. E. Rendle, W. D. Askew, and A. M. Hiddon.—Sorry there was no room this issue, next one for certain.

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"I FIND the *Optical Magic Lantern Journal and Photographic Enlarger* the most useful journal I take. With regard to useful and interesting news for lanternists,

IT STANDS UNRIVALLED."

(Extract from letter from Mr. E. Beardsley, 79, Manchester Street, Christchurch, New Zealand).